VINTAGE VETERAN AND CLASSIC TECH NOTE

Number V-5

It's Good to be Cool

It would be safe to say that when it comes to oils and lubricants, most people with the aid of a handbook can usually identify the correct oil to use for engine, gearbox and rear axle requirements. In some cases the information is quite detailed.

The same cannot be said in regards to radiator products.

Such statements as "use only rain water, or clean soft water" and in winter, "use an anti-freeze compound topping up as necessary" does not auger well for total cooling system protection. The "clean soft water" once its in the radiator will not be very clean or very soft for very long, and over "topping up" of anti-freeze will certainly cause corrosion if this method is applied.

Soluble oils were also added to cooling systems, the reason being that it was thought to provide exceptional lubrication to water pumps but all it did was to provide a rather oily mess with no creditable results whatsoever. A disadvantage would be that in hotter running engines, there is a risk of build of deposits in the engine from the oxidation of the oil – which of course does not help heat transfer. So this is far from ideal.

So having said that, what are the alternatives?

If we look at plain tap water, forgetting about "clean soft water", distilled water, spring water so on and so forth, we find that there are two distant disadvantages. The first is that it freezes in winter, the second it does nothing to stop corrosion. Distilled water on the other hand can be more corrosive than tap water. This is because distilled water grabs oxygen out of the air more readily than conventional tap water and passes the oxygen straight into the cooling system causing oxidation.

Now what is corrosion? In short there are four different types of corrosion, and it is perhaps beneficial to spend some time looking at each different type as they all play a significant role in cooling systems if not properly treated.

The first one comes under the heading of deposits.

These are the calcium carbonates which are the hard deposits one sees in such things as kettles if the water supply in the area is "hard" or contains minerals. These deposits adhere to the tubes in the radiator, restricting water flow and reducing the overall efficiency. This was the reason as to why the need for "filtered type waters" especially in England where "hard water" is quite common. South Australia is also known for its mineral-based water supply so the need for a "soft water" in these places is justified

The second form of corrosion is our old friend oxidation.

Oxidation is oxygen combining with iron to form rust and aluminium to form the white deposits so often found in castings etc. Oxygen also affects copper and causes the rapid colour degradation.

Thirdly we have electrolysis which can be defined as the chemical reaction with dissimilar metals which react with one another via water conducting electricity. Where aluminium is involved, such electrolysis preferentially attacks the aluminium and deposits it elsewhere leaving holes where there should be no holes!

And finally we have erosion which is sometimes confused with electrolytic corrosion. Erosion is mainly a mechanical problem caused by water flow and turbulence and is normally found in isolated areas of the engine.

So with the above in mind, and in particular with veteran, vintage and classic cars featuring large amounts of aluminium, copper, brass and bronze, it is therefore imperative to add something to water to protect against the derivatives of corrosion. The answer lies in a corrosion inhibitor.

VINTAGE VETERAN AND CLASSIC TECH NOTE

Now there are many products in the market today which purport to be corrosion type inhibitors. Most are Glycol based either Ethylene or Propylene and in nearly every case are distinguishable by their green dye. The use of Ethylene Glycol became common practice during the Second World War particularly in Rolls Royce Merlin aero engines. The benefits it had to offer as a corrosion inhibitor for use in motor vehicles becoming apparent towards the end of the 1940's. On the down side, the neat product is extremely corrosive apart from being highly toxic.

As an anti-freeze anti-boil package, a corrosion inhibitor is added to neutralise the corrosivity of the glycol. This is why you must be careful when selecting the dosage rate according to your radiator capacity. Too much water and the effectiveness of the corrosion inhibitor, is reduced to the stage where the entire contents of the radiator becomes corrosive. On the other hand, too much corrosion inhibitor will also cause the system to corrode, probably quicker, so it's of paramount importance to determine correctly the radiator capacity, and read the directions on the bottle for correct dilution rate.

There is little doubt that engines cooled by glycol run hotter than those using just water do. This sounds strange, but is due to certain basic physical characteristics of water when compared to glycol, the main ones being specific heat capacity (amount of heat the liquid will absorb), thermal conductivity (the ability of the liquid to distribute heat throughout itself) and heat transfer or thermal convection coefficient (the ability of heat to transfer from the hot engine to the coolant). It has been reported by some vintage car drivers that the differences between glycol and water in terms of cooling can be as much as 16℃ (30℉.)

If you study the wording on a pack of ethylene glycol mixture it will state the appropriate boiling rates at certain temperatures. For example a 50/50 mixture boils at 129℃ (265℉). As suming you are using a 15lb pressure cap and has a thermostat to control temperatures. Plain water on the other hand with a 15lb pressure cap boils at 121℃ (250℉).

Not many veteran and vintage cars have pressurised systems nor do they possess thermostats to regulate temperatures. This being the case, without a pressurised cap water boils at 100℃ (212℉) whilst a 50/50 ethylene glycol mixtur e boils at (106℃) (223℉). Does this small increase of 6℃ warrant the use of a gly col mixture over plain water with all its built-in problems particularly in a vintage engine?

The answer of course is no, but what are the alternatives.

The obvious solution is to use a non-glycol based corrosion inhibitor such as Penrite Oil's "CLASSIC CAR COOLANT".

This particular product offers a host of benefits for the veteran, vintage and classic car enthusiast both in cars on the road and during restoration. First of all, "C.C.C" is a very efficient inhibitor against electrolysis and oxidation. Its effectiveness in "soft" and "hard" water is well proven. The product contains no glycol as mentioned and is bio-degradable and non- toxic. Over diluted with excessive quantities of water, the product never becomes corrosive, nor does it change the basic cooling characteristics of water. Engines will indeed run cooler, yet not suffer from internal corrosion. Tests carried out using vintage cars showed that engines ran in some cases 8-10℃ cooler than those subjected to glycol treatmen ts. An added bonus for cars under restoration is that the product contains a vapour phase inhibitor meaning that all surfaces above the water line are protected. This means that if the cooling system is drained, no corrosion of the wetted surfaces will be found.

However, one must bear in mind that Penrite "C.C.C" whilst being a very effective anti-boil agent because of its superior heat transfer characteristics is not an anti-freeze. If you use your car under conditions where freezing may be experienced then the use of a glycol product is essential and to ensure that the correct concentration is used. Otherwise corrosion could be experienced.

Penrite "C.C.C" doesn't contain dyes, which may stain aluminium castings or leave unsightly marks on paintwork or plating.